

CLAIMS

1. A structural sandwich plate member comprising:
5 first and second outer plates;
a core of plastics or polymer material bonded to said outer plates with sufficient strength to transfer shear forces therebetween; and
a plurality of lightweight forms within the core, wherein said forms do not tessellate in a plane parallel to said outer metal layers and have principal dimensions in the range of from 20 to
10 200% of the distance between said outer metal layers.
2. A structural sandwich plate member according to claim 1 wherein said lightweight forms are arranged in a single layer.
- 15 3. A structural sandwich plate member according to claim 1 wherein said lightweight forms are arranged in multiple layers.
4. A structural sandwich plate member according to claim 3 further comprising an interlayer between two of said multiple layers of forms.
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5. A structural sandwich plate member according to claim 3 or 4 wherein the forms of one layer directly overly the forms of the layer below so that there are parts of the core material extending directly between the outer plates.
- 25 6. A structural sandwich plate member according to any one of the preceding claims wherein said lightweight forms are hollow.
7. A structural sandwich plate member according to any one of the preceding claims wherein said forms are spherical.
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8. A structural sandwich plate member according to claim 7 wherein said forms have a diameter substantially equal to $1/N$ of the distance between said outer plates, N being an integer in the range of from 1 to 5.

9. A structural sandwich plate member according any one of the preceding claims wherein said forms have a diameter greater than or equal to 20mm.

10. A structural sandwich plate member according any one of the preceding claims wherein
5 said forms have a diameter less than or equal to 100mm.

11. A structural sandwich plate member according to claim 6, 7, 8, 9 or 10 wherein said forms are made of polypropylene and have a solid skin.

10 12. A structural sandwich plate member according to any one of claims 1 to 10 wherein said forms are made of metal, ceramic, or a high tensile strength fabric, such as Kevlar(TM) or Spectra(TM).

13. A structural sandwich plate member according to any one of the preceding claims
15 wherein said forms have a plurality of protrusions so as to increase the spacing between them, and hence the proportion of the core cavity occupied by core material.

14. A structural sandwich plate member according to any one of the preceding claims wherein said forms are filled with an inert gas, a fire retardant substance, a thermal or acoustic
20 insulating fluid or a partial vacuum.

15. A structural sandwich plate member according to any one of the preceding claims further comprising a mesh, e.g of wire, to assist the placing of the forms and space them apart from each other and/or from the outer plates.

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16. A structural sandwich plate member according to any one of the preceding claims wherein said core has a thickness greater than or equal to 20mm.

17. A structural sandwich plate member according to any one of the preceding claims
30 wherein said outer plates are made of metal.

18. A structural sandwich plate member according to any one of the preceding claims wherein said outer plates have a thickness greater than or equal to 0.5mm.

35 19. A method of manufacturing a structural sandwich plate member comprising the steps of:

providing first and second outer plates in a spaced-apart relationship and a plurality of lightweight forms within the space between said plates, wherein said forms do not tessellate in a plane parallel to said outer metal layers and have principal dimensions in the range of from 20 to 200% of the distance between said plates;

5 injecting uncured plastics or polymer material to fill the space defined between said outer plates and around said plurality of forms; and

allowing said plastics or polymer material to cure to bond said outer plates together with sufficient strength to transfer shear forces therebetween.